



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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M/S 010
U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P.O. Box 30307
North Las Vegas, NV 89036-0307

Dear Dr. Summerson:

In accordance with the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act, and the Council on Environmental Quality's implementing regulations (40 CFR 1500-1508), the Environmental Protection Agency (EPA) is providing you comments on the Supplement to the Draft Environmental Impact Statement (EIS) for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, dated May 2001 (DOE/EIS-0250D-S, CEQ # 010159).

The Proposed Action addressed in the draft EIS was to construct, operate, monitor, and eventually close a geologic repository at Yucca Mountain in southern Nevada for the disposal of spent nuclear fuel and high-level radioactive waste currently in storage at 72 commercial and five Department of Energy (DOE) sites across the nation. The draft EIS described the potential environmental impacts of constructing, operating, monitoring and closing the repository.

While the fundamental repository concept has not changed from that described in the draft EIS, the design has continued to evolve. That evolution is described in the *Yucca Mountain Science and Engineering Report*, a summary of which was distributed to recipients of the Supplement. The Supplement evaluates the potential impacts of the so-called *flexible design* described in the Science and Engineering Report, and compares these to the impacts described in the draft EIS. EPA commends DOE for preparing the May 2001 Supplement to update the information in the draft EIS.

EPA's comments on the Supplement are detailed in the enclosure. We request additional information to clarify certain information, impacts and conclusions drawn in the Supplement. Because the Supplement is limited in scope, it does not address the comments EPA made on the draft EIS regarding the national transportation aspects of the project, nor does it provide most of

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- 1 cont. the additional data we requested on the projects's potential environmental impacts. EPA therefore continues to have environmental concerns with the project, per our rating of the draft EIS as "EC-2", Environmental Concerns-Insufficient Information.

EPA also notes that although this Supplement updates the repository design with current information, research at Yucca Mountain continues and DOE expects to make further refinements even after preparing the final EIS. In preparing the EIS at this stage of this complex, long-term project, DOE has determined that the range of operating modes in the current flexible design will produce environmental impacts representative of the range produced by foreseeable future designs and operating modes, and has conservatively estimated the bounds of the potential impacts of the flexible design. DOE is continuing to analyze the performance of the repository under different operating modes in an attempt to further reduce uncertainties and improve its performance.

- 2 EPA appreciates the benefits of ongoing research and recognizes the desirability of achieving the safest possible repository performance. If ongoing scientific studies support the EIS's bounding information, then the NEPA requirement to disclose the environmental impacts of a project should be satisfied. However, EPA encourages DOE to provide public review of and comment on new information that affects the project's design and operation. And, CEQ regulations (sec. 1502.9) require a supplement to a draft or final EIS when an agency makes substantial changes to a proposed action relevant to environmental concerns or where there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

- 3 As a general comment, EPA notes that since this supplement was prepared, the EPA Administrator has signed 40 CFR Part 197, *Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada*. The final EIS and any other supplements should reference these standards. Also, any subsequent documents should incorporate the provisions of Part 197 into the discussion and comparisons made in the EIS, e.g., the references to the "postclosure receptor" being located 20 kilometers south of the repository are outdated.

Thank you for the opportunity to review this Supplement. If you have any questions or would like to meet with EPA on these comments, please contact Susan Absher of my staff. She may be reached at 202/564-7151.

Sincerely,



Anne Norton Miller
Acting Director
Office of Federal Activities

Enclosure

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SPECIFIC EPA COMMENTS

Supplement to the Draft EIS for a Geologic Repository for the Disposal of
Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain
(DOE/EIS-0250D-S, May 2001)

- 4 [Page 2-11, Section 2.3.1.](#) This section describes repository closure, but provides no details on post-closure monitoring other than a reference to the NRC proposed rules. The final EIS should provide a more detailed description.
- 5 [Page 2-12, Section 2.3.2.1.](#) In the final sentence of the first paragraph, it is unclear why the "basic facilities for personnel support, warehousing, security, a concrete plant for fabricating and curing precast components and supplying concrete for in-place casting, and transportation (motor pool)" are inside the radiation control area (RCA). If such facilities have radiation concerns, the reasons and impacts should be explained.
- 6 [Page 2-13, Figure 2-4.](#) The "potential commercial spent nuclear fuel aging area" is inside the RCA but apparently outside the security station. What security controls will there be for this area?
- 7 [Page 2-21, Section 2.3.3.2.](#) The second paragraph states that "this low ventilation rate [0.1 cubic meter per second] would permit monitoring of the air stream exhausting from the drifts for leaks of radioactive material, but would not contribute significantly to removal of heat from the emplacement drifts." This is followed by a discussion of the higher ventilation rate [15 cubic meters per second] under the new flexible design, but there is no mention of monitoring. Does this mean that the flexible design does not allow for monitoring of the exhaust air? If so, this raises public health and on-site safety concerns. The final design must include effective monitoring and a system to divert the air into high-efficiency filtering systems in case releases are detected.
- 8 [Page 2-31, Section 2.4.](#) The last two sentences of the fourth paragraph state: "The effect of drift spacing on these related parameters would be less than the effect of waste package spacing in the analytical scenarios presented in this Supplement. Therefore, DOE did not perform a quantitative evaluation of the environmental impacts of variable drift spacing." EPA questions the basis for this statement and conclusion. What about interactions? The distance between waste packages is an independent design factor from the distance between drifts. Therefore, there is a range of potential conditions and impacts that could occur. These impacts should be assessed or a more detailed rationale provided for the statements and conclusion.
- 9 [Page 2-31, Section 2.4.](#) The first sentence of the final paragraph identifies "Uncertainties in future funding profiles or the order of...waste shipments" could affect the construction of the repository. The next sentence states that this approach could "potentially increase confidence in meeting the schedule for waste receipt and emplacement." DOE should explain how uncertainties in funding can result in increased confidence for meeting the schedule.

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- 10 Page 3-11, Section 3.1.8, Accidents. All of the doses to the maximally exposed individuals exceed by 2.5 to 3.2 times the current radionuclide NESHAPs standards. The information to determine these results should be provided.
- 11 Page 3-17, Section 3.1.14, Transportation. We note that the transportation impacts are increased for the *flexible design* over the draft EIS design. These increased impacts, as well as those noted in other areas, should be incorporated into the final EIS analysis.
- 12 Page 3-20, Section 3.2.2. Following Table 3-12 is a statement that the integrating software for the Total System Performance Assessment has changed from that used for the original DEIS to GoldSim®, and that "GoldSim® incorporates much the same performance assessment calculational approach, but with substantial improvements in the user interface and data handling." The final EIS should provide support for this statement because changing the software which integrates the many programs which are used in the Total System Performance Assessment (TSPA) introduces uncertainty into the comparison of previous results.
- 13 Page 3-21, Table 3-13. This table lists a change in the "Unsaturated zone flow" as "Coupling between thermal, hydrologic, and chemical effects." What is the status of the modeling and research on these coupled processes?
- 14 Page 22 of the Executive Summary of the Yucca Mountain Science and Engineering Report. Under Performance Confirmation and Monitoring is stated, "Performance confirmation and monitoring activities would continue throughout the preclosure period, which could extend up to 300 years." Does DOE have confidence in such a long performance-monitoring period particularly in light of the statement on page 2-31 of the Supplement about "uncertain funding" for even the relatively shorter term construction of the disposal system and transporting of the waste?

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RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE SUPPLEMENT TO THE DRAFT EIS (Comment Document 10231)

1. The Final EIS includes this Comment-Response Document, which identifies and addresses each of the comments received on both the Draft EIS and the Supplement to the Draft EIS. In response to public comments, DOE modified the Final EIS in a variety of ways, including clarifications or changes to the text, updating information, and modifying analyses. The Department considered comments on the Draft EIS in preparation of the Supplement to the Draft EIS (which were appropriately carried forward to the Final EIS). In part, for example, the comments received on the Draft EIS influenced DOE's description of the Science and Engineering Report design elements presented in the Supplement. The Supplement was limited in scope to "aspects of the design that have changed since DOE issued the Draft EIS" (which did not include transportation).

Consistent with Council and Environmental Quality and DOE regulations, the Department did not release the Comment-Response Document before issuing this Final EIS or hold hearings on the Comment-Response Document or this Final EIS.

2. In response to public comments, DOE modified the Final EIS in a variety of ways, including incorporation of the flexible design (introduced in the Yucca Mountain Science and Engineering Report and the Supplement to the Draft EIS), clarifications or changes to the text, updating information, and modifying analyses. DOE believes that the environmental impacts presented in the Final EIS for the flexible design (and its associated operating modes) bound reasonably foreseeable actions.

In June 2001, DOE conducted three public hearings on the Supplement to the Draft EIS to provide the public with opportunities to comment on the Project's latest plans for design and operation. In September and October 2001, the Project conducted hearings on key documents that were released in advance of a potential Site Recommendation [*the Yucca Mountain Science and Engineering Report* (DIRS 153849-DOE 2001) and the *Preliminary Site Suitability Evaluation* (DIRS 155734-DOE 2001)].

Upon issuance of the Final EIS, the public will have the opportunity to examine the Comment-Response Document and the Department's response to the public's comments. This approach is consistent with regulations issued by the Council on Environmental Quality and DOE's implementation procedures at 10 CFR 1021.

Should the Secretary of Energy recommend Yucca Mountain to the President, however, the recommendation would be accompanied by several supporting documents including the Final EIS and its Comment-Response Document. In the event Yucca Mountain was authorized and the project moved forward, DOE would submit a License Application to the Nuclear Regulatory Commission. The Nuclear Regulatory Commission's licensing process would afford the public additional opportunities to review and comment on the specific design elements of the Yucca Mountain repository. In the event that DOE incorporated additional design modifications subsequent to the submittal of a License Application, the Nuclear Regulatory Commission's licensing process would provide additional opportunities for the public to comment on the repository.

3. After DOE issued the Supplement to the Draft EIS in May 2001, both the Environmental Protection Agency standards at 40 CFR Part 197 and the Nuclear Regulatory Commission licensing criteria at 10 CFR Part 63 were promulgated. In addition, in 2001 DOE promulgated its 10 CFR Part 963 guidelines to be consistent with the adopted EPA standards and the NRC licensing criteria. The estimated impacts presented in the Final EIS fully consider, and provide comparisons with, the final standards as promulgated. DOE has modified Chapter 11 of the EIS to include the final regulations.
4. A postclosure monitoring program is required by 10 CFR Part 63. This program would include the monitoring activities that would be conducted around the repository after the facility was closed and sealed. The regulations require that a license amendment be submitted for permanent closure of the repository [10 CFR 63.51(a)(1) and (2)]. This amendment must specifically provide an update of the assessment for the

repository's performance for the period after permanent closure, as well as a description of the program for postclosure monitoring. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the geologic repository's engineered barriers; or increasing the exposure of individual members of the public to radiation beyond allowable limits. The details of this program would be defined during the processing of the license amendment application for permanent closure. Deferring a description of this program until the closure period would allow for the identification of appropriate technology including technology that could become available in the future.

5. The description in the Supplement to the Draft EIS should have read: Other support facilities planned for the North Portal Operations Area include basic facilities for personnel support, warehousing, security, and transportation (motor pool). Section 2.1.2.1.1 of the Final EIS reflects this clarification.
6. To avoid compromise, details of physical security plans are typically not made available to the public. However, DOE believes that security for the spent nuclear fuel surface aging facility would be similar to that required for existing commercial Independent Spent Nuclear Storage Facilities currently licensed by the Nuclear Regulatory Commission. At a minimum, security controls would include positive control on ingress and egress at the facility, as well as periodic surveillance by security personnel. Detailed security requirements for all areas of the proposed repository, including the fuel aging facility, would be included in the construction and operating license approved and issued by the Nuclear Regulatory Commission.
7. The flexible design does include monitoring of the exhaust air and the ability to filter the exhaust stream if radioactive contamination was detected. The design would comply with applicable health and safety requirements.
8. The Final EIS is based on the flexible design described in detail in the Science and Engineering Report (DIRS 153849-DOE 2001). Thermal management of the proposed repository would involve complex, nonlinear relationships among many parameters of the repository system [see the Science and Engineering Report (DIRS 153849-DOE 2001) for further discussion]. The major determinants of the peak temperatures are the age of the fuel at emplacement, the linear heat load along each drift, and the ventilation period after emplacement. By keeping the drift spacing constant, the overall feasibility of the various repository operating modes can be evaluated. The analysis presented in the Science and Engineering Report supports the environmental impact conclusions in the EIS. The Science and Engineering Report recognizes that the thermal load or areal mass loading can be varied also by the liner thermal load (which was done in the Science and Engineering Report), the drift spacing (which was not done in the Science and Engineering Report), or both. By varying the fuel age, waste package spacing, and ventilation, DOE has considered the major factors that would affect temperature variations in the repository. As noted in both the Science and Engineering Report and the Supplement to the Draft EIS, future studies could include variations in drift spacing. At present, DOE does not expect the conclusions drawn from the analysis in the Final EIS to change substantially as a result of variations in drift spacing versus waste package spacing.
9. As mentioned in Section 2.4 of the Supplement to the Draft EIS, uncertainties in future funding or the order of waste shipments might require the repository to be developed in a sequential manner, such as constructing the surface and subsurface facilities in portions or "modules." This approach would incorporate "lessons learned" from initial work into subsequent modules, reduce the initial construction costs and investment risk, and potentially increase confidence in meeting the schedule for waste receipt and emplacement. The intent of this discussion was not to imply that uncertain funding would increase confidence.
10. The information and analyses used to estimate the reasonably maximally exposed individual doses are provided in Appendix H. National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61) are applicable only to routine or permitted releases. They do not apply to accidents. Since publication of the Draft EIS, the Environmental Protection Agency promulgated *Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada*, at 40 CFR Part 197, which included an annual dose limit to a member of the public of 15 millirem (40 CFR 197.4). In accordance with requirements of the Energy Policy Act, the Nuclear Regulatory Commission subsequently promulgated Yucca Mountain licensing criteria, which includes a Preclosure Public Health and Environmental Standard at 10 CFR 63.204 of 15 millirem per year to a member

of the public. The appropriate sections of the EIS (including those mentioned in Chapter 8) have been updated to reflect a comparison to the recently promulgated standard of 15 millirem.

11. The flexible design presented in the Supplement to the Draft EIS was carried forward to the Final EIS analyses.
12. Golder Associates, Inc., developed both GoldSim (the integrating software used for the Supplement to the Draft EIS and Final EIS) and RIP (the software used for the Draft EIS). GoldSim is a new generation of the RIP program, not an entirely different program. The differences have more to do with user interface convenience and the mechanics of data handling than with the actual modeling. Nevertheless, as part of the production, delivery, and documentation of GoldSim, Golder Associates validated that program against RIP by running similar cases in both. Thus, differences in the integrating software caused no differences between the Draft EIS, the Supplement to the Draft EIS, and the Final EIS.
13. The modeling for the Supplement and the Final EIS for long-term performance analysis includes improved coupling of these processes over the essentially uncoupled versions used for the Draft EIS. Section I.2.3 of the Final EIS and the documents referenced in that chapter discuss these models.
14. As reported in *Nuclear Waste Fund Fee Adequacy: An Assessment* (DIRS 153257-DOE 2001), the nuclear waste fund investments had a market value of \$8.5 billion as of September 30, 1999. The analysis in the report found that the current fee of 1 mil (one tenth of 1 cent) per kilowatt hour charged to generators of commercial spent nuclear fuel was adequate to cover projected disposal expenses (including costs associated with packaging and transportation) and recommended that the fee remain unchanged.

Section 302 of the Nuclear Waste Policy Act of 1982 specifies that funding for disposal of commercial spent nuclear fuel is provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear power plants. Equivalent amounts are paid by the Federal Government to cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. Utility fees and Federal appropriations are required to be sufficient to offset expenditures associated with repository studies; transportation; and operations and closure of a repository, as determined by an annual review by the Secretary of Energy. In the event that future generations decide that the potential repository should remain open for an extended period (up to 300 years or more), the fee structure could require modification. The statement, about “uncertain funding,” was intended to be in the context of funding requirements for those activities (in the relative near-term leading up to the ability to receive and emplace waste (if the site was recommended and approved), and was not intended to reflect doubt about funding once the facility, if approved, became operational.